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ABSTRACT

This paper describes a qualitative research study concerning the use of the World Wide Web to create electronic teaching portfolios in a preservice teacher education pilot course at the University of Virginia. The goal of the pilot course was to learn about the participants' purpose in creating an electronic teaching portfolio, the process they employed to create one, and the learning gained in the process. Interviews with the participating preservice teacher education students, participant observation in their class, and analysis of the journals students maintained revealed that the process was constructivist, demanding, and multifaceted. A brief review of the literature is provided, as well as a discussion of the following empirical assertions that resulted from the study: (1) creating electronic teaching portfolios is a constructivist process that promotes an examination of students' beliefs, philosophies, objectives, and purposes for teaching; (2) constructing electronic teaching portfolios using technology, specifically the Web, was a complex and demanding process for students; and (3) students enrolled in the course to enhance their technology skills, to create a portfolio in a structured manner, and to make themselves more marketable for jobs. (Author/AEF)

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Web-Based Electronic Teaching Portfolios for Preservice Teachers

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Abstract: This paper describes a qualitative research study concerning the use of the World Wide Web (WWW) to create Electronic Teaching Portfolios in a preservice teacher education pilot course. The goal of the pilot course was to learn about the participants' purpose in creating an Electronic Teaching Portfolio, the process they employed to create one, and the learning gained in the process. Interviews with the participating preservice teacher education students, participant observation in their class, and analysis of the journals students maintained revealed that the process was constructivist, demanding, and multifaceted. A brief review of the literature will be provided as well as a discussion of the empirical assertions that resulted from the study.

"The use of teaching portfolios in evaluating teacher performance is expanding, having been given particular attention by the National Board for Professional Teaching Standards, which requires teachers seeking national certification to submit portfolios to assessors for examination." (Cooper, 1997)

Introduction

One challenge in teacher education is how to measure preservice teachers' professional knowledge base and competence to teach. Multiple choice tests, which are easy to administer, grade, and use, are inadequate measures of the myriad of skills and knowledge that teachers should be able to demonstrate and use for instruction. These paper and pencil tests are incapable of measuring the performance-based Interstate New Teacher Assessment and Support Consortium's (INTASC) . Furthermore, the (NBPTS) recognizes the need for performance-based measures by requiring practicing teachers to submit portfolios in order to gain National Board Certification.

In response to such challenges, many schools of education are beginning to incorporate the use of portfolios as performance-based measures. McKinney (1998) explains that "[teacher] educators have found that well-constructed portfolios may help to capture the complexities of learning, teaching, and learning to teach when used as authentic assessment tools within courses and programs in Colleges of Education (p. 85). Also, portfolios can be considered performance-based because they "[allow] the learner to display a variety of evidence of performance, such as products or exhibitions"(Georgi & Crowe, 1998, p. 74). Another characteristic of portfolios is that they encourage preservice teacher education students to be more reflective about what they have learned through their university courses and student teaching. In addition, portfolios serve to document preservice teachers' competence and growth during the course of their entire teacher education program. Yet, most portfolios that are being used in schools of education today are primarily print-based (compiled in a binder), although they often contain teaching videos as one of the components. Now, with current technologies, it is possible to create Web-based, or Electronic Teaching Portfolios. Should schools of education invest the effort and time in teaching preservice teacher education students to create such portfolios? How can technology, specifically, the World Wide Web (WWW) facilitate the creation and utilization of Electronic Teaching Portfolios?

This paper describes a qualitative research study about use of the WWW to create Electronic Teaching Portfolios in a preservice teacher pilot education course. The goal of the pilot course was to discover the participants' purpose in creating an Electronic Teaching Portfolio, the process they employed to create one, and the learning gained in the process. A brief review of the literature will be provided as well as the series of empirical assertions formulated through the process of analytic induction (Erickson, 1986).

Electronic Teaching Portfolios

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An Electronic Teaching Portfolio, sometimes referred to as a digital portfolio, is similar to a traditional portfolio, however, the medium used to present and organize it is different: It is organized using a combination of electronic media such as audio recordings, hypermedia programs, database, spreadsheet, video, and wordprocessing software, as well as CD-ROMs and the World Wide Web. In other words, "[the] electronically enhanced portfolio augments the traditional print portfolio with electronic materials that can strengthen particular portfolio components" (Lieberman & Rueter, 1997, p. 46). How it is published depends on the resources available in addition to the teacher's objectives. The items in the Electronic Teaching Portfolio will depend on its purpose (e.g., is it to fulfill the requirements of a course or teaching license), the instructors' and the students' technology experience, the resources available, and the amount of time (e.g., stand alone semester methods course or several years).

Tuttle (1997) contends that electronic portfolios should be used because they demonstrate wider dimensions of learning, their parts can be interconnected, and they save space. Lieberman and Rueter (1997) also contend that there are many advantages to using electronic portfolios, which they refer to as an "electronically augmented portfolio". Some of the advantages they discuss are:

- More types of information about the individual and his/her teaching can be included and displayed;
- Materials presented can be animations, simulations, and video clips;
- Electronic publications on the Internet…can be easily accessed;
- Portfolio materials are not lost during transport between reviewers (p. 4748).

Other advantages to using Electronic Portfolios by elementary school students, described by Bushweller (1995), were the use of audio and video recordings to document students' reading skills and the "effect in parent conferences" (in Georgi & Crowe, 1998, p. 80) of parents hearing audio clips of their children reading.

Although there are many advantages to using Electronic Teaching Portfolios, there are numerous disadvantages, too. Some of the disadvantages Lieberman and Rueter (1998) raise are:

- There may be too much emphasis on the 'bells and whistles' of the portfolio rather than on using technology to support the portfolio and meet the objectives of the designer;
- Potentially the readers of the portfolio may need to be provided with appropriate hardware and software in order to access information on a disk or on Internet provided by the portfolio designer;
- Portfolio readers and/or reviewers need to be educated about the importance of reviewing diverse portfolio components, e.g., electronic media.
- It may be inconvenient for the readers/interviewers to access the electronic information presented (p. 48-49).

Other disadvantages, discussed by McKinney (1998), are the amount of time needed to complete the portfolio, memory limitations, lack of access to the software and hardware to create the portfolios at home, and difficulties in mastering the technology itself.

While the use of Electronic Teaching Portfolios is growing, only a few studies have examined them in teacher education. Much of the research on Electronic Portfolios deals with K-12 portfolios. However, teacher educators are beginning to see how technology can be used to facilitate the process. Gamon and Robinson (1996) describe the use of CD-ROM portfolios at Eastern Washington University (EWU). At EWU, students complete their portfolios prior to graduating from the teacher education program (in Backer, 1997). These portfolios contain the students' accomplishments, teaching experiences, and evaluations.

Read and Cafolla (1997) also discuss what they have learned from the introduction of Electronic Teaching Portfolios instruction at Florida Atlantic University:

"Developing and implementing multimedia preservice teacher portfolios is an enormous responsibility and task. It requires the cooperation of students, faculty, staff, and administrators. The team in charge of the project must continually revise procedures, be aware of problems, seek solutions to problems, and keep students, staff, and faculty motivated as they move into the future."

Read and Cafolla assert that it is a complex process that involves more than just the students and an instructor.

McKinney (1998) conducted a study of five preservice teachers who constructed electronic teaching portfolios using the multimedia program HyperStudio. The students who volunteered to participate in the study were "confident in their use of technology…[and] saw the potential of the technology for themselves and for use in their future classrooms" (p. 100-101). McKinney found that the process of creating Electronic Teaching Portfolios was very positive, resulting in much reflection. In addition, she discovered that the students invested a great deal of time in creating their portfolios and encountered some problems with storing the portfolios and the software utilized to create them. She also suggested that further research should be conducted related to "how portfolios are used,…how to structure their development and how to support their use " (p. 101).

Research Methodology and Methods

Paradigm and Conceptual Framework

The paradigm for this study is interpretive inquiry. The main methodological assumption of interpretive inquiry is the focus on social interaction and the interplay between such interaction and the wider social context in which it occurs. Erickson (1986) explains that social interaction should be examined from the actors' points of view in a "wider social world" (p. 120); each of these points of view can have a different, even conflicting perspective. In such inquiry, the objective is to answer (or to discover and analyze) "What is happening?" (p. 121, 124). The conceptual framework for this study was constructivist theory; the roots of constructivist theory arise from the works of Vygotsky and Piaget, in addition to several other theorists. The conceptual framework defines the role of the researcher, forecasts the design for data collection, and grounds the study in a larger context. While there are different views of constructivism, such as cognitive and sociocultural constructivism, Duffy and Cunningham (1996) contend that constructivists of all stripes generally perceive "(1) learning [as] an active process of constructing rather than acquiring knowledge, and (2) instruction [as] a process of supporting that construction rather than communicating knowledge" (p. 171). In addition, they assert that constructivists "view the learning as the activity in context" where "[the] situation as a whole must be examined and understood in order to understand learning" (p. 171.)

Course Description

EDLF 589-04, *Electronic Teaching Portfolios*, was an elective, one credit, preservice teacher education pilot course, offered in Spring, 1998, at the University of Virginia's Curry School of Education. The Curry School offers a five-year teacher education program, in which students earn a bachelor's degree in an academic major as well as a Masters in Teaching. The goal of the pilot course was to learn about the process of using the WWW in the creation of Electronic Teaching Portfolios. The objectives of the course were for students to create Electronic Teaching Portfolios, to reflect upon their coursework and teaching experiences, and to become more proficient in the use of technology.

The course met once a week for an hour, followed by an hour of open lab time in which the instructors would be available to help students individually. The class was taught in a multimedia laboratory comprised primarily of PowerMac Macintosh computers. The software program utilized to create the portfolios was Claris HomePage; this program was chosen primarily because of its availability in the laboratories in the School of Education. The students had access to their own computer as well as digital cameras, scanners, and the Internet. The course syllabus is available at .

Participants

The course was advertised via e-mail to all of the fourth-years, fifth-years, and Masters students in early January of 1998. Eleven students enrolled in the course. One decided to drop the course because she had accepted a position to teach in a foreign country; another student decided to audit the course because she was having doubts about entering the teaching profession but wanted to continue to learn how to create Web sites. Of the nine remaining students, six were graduating, two were in their first year of the Masters of Teaching program (they had already earned bachelor's degrees at other institutions), and one was in her fourth year. Three students wanted to teach secondary English, one wanted to teach secondary History, and the rest of the students wanted to teach at the elementary level. The only students who had completed student teaching assignments were those who were graduating. In addition, of the nine students receiving a grade, six had never created a Web page. Therefore, instruction had to be geared to meet their needs.

Data Collection and Analysis

A number of strategies were used for collecting data. The two primary methods were interviews and participant observation. Seven of the students participated in one interview at the end of the course with the researcher. Interviews, lasting between thirty and sixty minutes, were taped and transcribed. The researcher also was one of the instructors of the course. She participated in all but one of the class meetings--most of which lasted two

hours. The researcher kept a journal of the course, which included observations, student comments, and anecdotal notes about student comments, progress, and questions. Other forms of data included: students' journals, their portfolios, and an informal questionnaire using a Likert scale that was developed by the researcher.

Erickson's (1986) approach to data analysis, analytic induction, was utilized for this study. His approach is holistic and considers the researcher's assumptions as well as the participants'. At the heart of Erickson's approach to data analysis, is the formulation of empirical assertions--conclusions or statements about the data made through analytic induction. These assertions in turn must be confirmed or disconfirmed by a search for empirical warrants. Warrants can be exemplified by direct quotes from documents, fieldnotes, interviews, or observations that have not been combined to form a portrait of the situation being studied. According to Erickson (1986), "this is done by reviewing the data corpus repeatedly to test the validity of the assertions that were generated" (p. 146).

Results of the Study

Students reported, in taped interviews at the end of the course and in the journals they maintained the entire semester, that the process of creating Electronic Teaching Portfolios was very positive, resulting in reflection about themselves and about the teaching profession. However, it also was very frustrating at times and time consuming for the students. One of the main frustrations was learning to use the technology. The goal of the pilot course was to learn the participants' purpose in creating an Electronic Teaching Portfolio, how they created it (the process), what they learned as a result of creating their portfolios, and the advantages and disadvantages in using the WWW to create these portfolios. The following empirical assertions were warranted through the process of analytic induction:

Assertion 1: Creating Electronic Teaching Portfolios is a constructivist process that promotes an examination of students' beliefs, philosophies, objectives, and purposes for teaching.

The process of creating the Electronic Teaching Portfolios was a challenging, constructivist process that required students not only to master the technology skills but also to critically evaluate their beliefs, philosophies, objectives, and purposes for teaching. Choosing what to put into their portfolios was difficult for those who had amassed boxes full of activities, papers, and unit lesson plans, and for those who had not yet experienced student teaching (the fourth years and Masters of Teaching students in their first year of the program). Students often asked: "What should I include in the portfolio? A whole unit, one lesson, a variety of lessons?" Several discussions ensued as a result of such questions with students taking different positions about what or how much to include. Some students argued that the portfolio should be as concise and simple as possible, considering most viewers (such as principals) do not have the time to spend reviewing the portfolios; others maintained that it should be rich and visually pleasing, with many artifacts supporting one's competence. In the end, students determined on their own what was most acceptable to them. Curiously, no two portfolios were alike.

Besides deciding what to include, students had to determine how to organize and present their work on the WWW. The process for most students involved working collaboratively with other students in the course, learning how to use the technology, and exploring ways to organize and present the portfolios. The process was constructivist in that students were actively involved in creating and piecing together their portfolios. "Central to the vision of constructivism is the notion of organism as 'active'--not just responding to stimuli, as in the behaviorist rubric, but engaging, grappling, and seeking to make sense of things" (Perkins, 1992, p.49). It was evident that students were engaged in such conduct. One student explained the process she undertook in creating her portfolio:

"Well, I guess it started with surfing the Web and seeing what current electronic portfolios look like. Then going to the [Teaching Resource Center] and looking at portfolios on paper and then making notes to myself about what I would want in my own, and coming up with a table of contents to organize it. And then basically, you know, just the whole, the whole process of copying your documents, choosing your backgrounds, choosing your clip art, so basically it was getting that background information and understanding it and then deciding which were my personal decisions about what should go in and how it should look. I mean, that really does develop over time. Also, I really liked looking at the work of other people in the class. [Student's name deleted] helped me figure out how to do, like, in the portfolio and [Student's name deleted] resume helped me figure out how to put student teaching in there. So I think it was really collaborative and that we all made good use of our resources. Definitely wasn't done in isolation and this class just made it much more collaborative than it would be otherwise." [Interview with First year Masters Student]

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Students learned a great deal about themselves and their beliefs connected with teaching as a result of creating their Electronic Teaching Portfolios. As with other studies regarding portfolios in teacher education, the act of creating portfolios in this course fostered reflection. As one student explained:

"I think I've learned the importance of self-awareness. Of knowing what your goals are and knowing where you stand in philosophies. It helps you much more be critically aware and lets you be more observant when you're reading other texts or when you're reading other resources in your classes. And you say "hey, this is what I believe in." When you're fully aware of what you're thinking of, rather than just saying hey, sounds like a good idea, without knowing exactly where it stands with comparison to your policy." [Interview with graduating student]

Assertion 2: Constructing Electronic Teaching Portfolios using technology, specifically the WWW, was a complex and demanding process for students.

Using the WWW as the presentation medium was demanding not only in terms of learning the idiosyncrasies of the technology itself, but also in understanding the big picture. Understanding what the end product would look like took time for students to understand. The biggest hurdle, however, regarding the use of the WWW, especially for those who had not ever created a Web site, was learning the technology. Creating the Web sites did not always go smoothly, and many students became frustrated and angry, as a student described her experiences in learning to use the technology:

"Just getting over the hurdle of all this computer stuff... but all the little glitches, it's just something I had a good attitude and then I also had a bad attitude. But it's one of those things you just have to jump in and do it. And you don't like it while you're doing it, when you're struggling, but once you've succeeded you love it, it's the best thing ever. So, I guess just in general, just the little glitches when you thought you did it right and, you know, and it's not, the spacing's all off.... it's more just the, the whole home page kind of when you change to the computer language... that was the most confusing part that it would just assume, you know, it would take a picture and just assume it got it from the desktop and then it wouldn't show up. So just those little, little things that you, even in a book you don't understand until you do it, really do it." [Interview with Graduating Student]

While there were many examples of university professors' Electronic Teaching Portfolios on the Web, there was a dearth of portfolios by inservice or preservice teachers. Because of the lack of examples on the Web, students had to rely on the instructors and each other for suggestions on how to organize and present their portfolios. In addition, many of the students' activities and lessons had to be recreated or re-worked to put them on the Web; in some cases, students decided it was not worth the trouble to try to figure out how to include some of their work on the Web.

Assertion 3: Students enrolled in the course to enhance their technology skills, to create a portfolio in a structured manner, and to make themselves more marketable for jobs.

Students primarily took the course for three reasons: 1) to enhance their technology skills, 2) to create a portfolio in a structured manner, and 3) to make themselves more marketable for jobs. All of the students in the course except for one--who considered himself competent in using technology--mentioned taking the course to gain or improve technology skills. Students viewed the creation of a teaching portfolio as valuable not only in their endeavors to find a job, but also as a way to demonstrate what they had learned so far. The students indicated that while they believed it was important to create a portfolio, they also recognized they wanted guidance to create their portfolios, which the course could offer. Surprisingly, even the students who were not graduating wanted to create portfolios to make themselves more marketable for future job interviews, or at the very least to demonstrate to others in a meaningful way their experience at the Curry School. In addition, the students viewed the technology skills they learned in the course to be beneficial both personally and professionally; indeed, several of them perceived that knowing these skills would help them with their own students in the future. As one student explained:

"Well, actually in December when I went home after student teaching I really wanted to start getting a portfolio together. And then over, the break just went really quickly and I never really, I just had stacks of stuff I wanted to include and I knew I had to go back and change some things. When I came back I saw your E-mail and I wanted to, I thought I wanted some guidance on how to do it correctly. Cause no one had really said, there's no class that tells you how to do it. And also technology, and I wanted to take the opportunity to, my last year, to make sure I was equipped with it. And right now I have a contract with [county name omitted] County and in with [county name omitted] County you have to make a Web site with your kids." [Interview with graduating student]

Conclusion

Electronic Teaching Portfolios created using the WWW combine the benefits of a standard teaching portfolio with the advantages and challenges of learning to master the use of technology to present them. As schools of education and NCATE explore the possibilities of using technology to organize and present portfolios, they also should keep in mind the disadvantages to using technology and privacy issues. Creating Electronic Teaching Portfolios can be both frustrating and rewarding. An added benefit to using Electronic Teaching Portfolios is that they also can demonstrate students' competence in the use of technology. Finally, more research should be conducted to determine whether the cost and time outweigh the resultant reflection and technology skills that students learn in the process of creating Electronic Teaching Portfolios. Just as McKinney (1998) suggested, more research needs to be conducted regarding portfolios, especially with respect to Electronic Teaching Portfolios.

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